

# PATTERN RECOGNITION SPEEDS DETECTION OF BREAST CANCER

Costs for mammography services, estimated in 1992 to be as much as \$3 billion in the United States<sup>3</sup>, account for a large portion of medical expenses. When adapted to medical use, BMDO-funded research in pattern recognition technology can reduce these mammography costs by speeding analysis and diagnosis. This technology may also reduce the number of deaths from breast cancer, since it can detect the disease earlier than conventional mammography techniques.

Rose Health Enterprises (Denver, CO) and Lockheed Martin (Denver, CO) formed a company called MedDetect, LLC, to use such BMDO-funded technology to analyze medical images. MedDetect's optical system is projected to quickly identify 75 percent of screening mammograms that are negative, allowing doctors more time to examine potential cancer cases closely.

**M**EDDETECT'S SYSTEM IS PROJECTED TO QUICKLY IDENTIFY 75 PERCENT OF SCREENING MAMMOGRAMS THAT ARE NEGATIVE, GIVING DOCTORS MORE TIME TO EXAMINE POTENTIAL CANCER CASES CLOSELY.

In addition, the technology makes screening a more powerful and accurate tool by automatically identifying abnormal image attributes. In preliminary tests on an archive of mammographic images, it has already detected a cancerous breast lesion, that, using conventional mammography, did not appear for another year.

MedDetect's initial work in the medical arena has been focused on integrating optical processors with complex algorithms to improve mammographic images. But the company expects to use these methods in other medical applications as well, such as to improve cancer detection processes in chest x-rays and Pap smears. It is

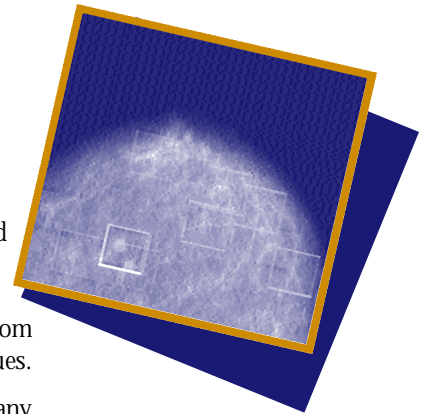
using much of the technology, including target scene generation software and optical components for rapid data processing, that Lockheed Martin developed with BMDO funding for advanced target acquisition and recognition.

MedDetect's optical system will be compatible with "filmless" digital mammography, which several companies and research groups, such as Fischer Imaging (Denver, CO), NOVA R&D (Riverside, CA), and ThermoTrex (San Diego, CA) are developing. Using MedDetect's technology, digital x-ray images can be analyzed in less than a minute. The images can then be transmitted to another radiologist for a second opinion. In addition, digitally storing images at a central location allows physicians to quickly access records for baseline image analysis and comparison.

Both Rose and Lockheed Martin are providing seed money for MedDetect, with plans to raise additional private capital and have a prototype available within 18 to 24 months. Technology improvements achieved by MedDetect will also be returned to Lockheed Martin's defense technologies.

## ABOUT THE TECHNOLOGY

MedDetect's system is a hybrid of optical and digital processing. An optical correlator uses lenses and a low-power laser to examine the mammogram. The optical correlator, with programmable spatial light modulators and Fourier transform lens pairs, uses photons instead of electrons to perform the calculations to detect an abnormal feature. This information is then transmitted to a computer that uses neural network software to "learn" the specific attributes of breast abnormalities. The learned information is stored and applied to new images.



● Bold white boxes indicate possible abnormalities in this mammogram.

<sup>3</sup>How Much Preventive Care Can We Afford?...K. Terry; *Medical Economics*, August 23, 1993, p. 124.